1

## SEQUENCE LISTING

		<	110>	Reg	ents	of 1	the 1	Univ	ersi	ty o	f Mi	nnes	ota e	et al	1.	
5		< 1	120>	Str	epto	cocca	al C	5a p	eptio	lase	vac	cine				
		< 1	130>	600	.4501	WO1										
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		< :	170>	Fast	ESEQ	for	Wind	lows	Ver	sion	3.0					
20			210>	1												
20			211>		1											
			212>		-											
					eptod	cocci	ים בו	/oqei	nes							
					•											
25		< 4	100>	1												
	Leu	Arg	Lys	Lys	Gln	Lys	Leu	Pro	Phe	Asp	Lys	Leu	Ala	Ile	Ala	Leu
	1				5					10					15	
	Met	ser	Thr	Ser	Ile	Leu	Leu	Asn	Ala	Gln	Ser	Asp	Ile	Lys	Ala	Asn
				20					25					30		
30	Thr	Val		Glu	Asp	Thr	Pro		Thr	Glu	Gln	Ala	Val	Glu	Thr	Pro
			35					40					45			
	Gln	Pro	Thr	Thr	Val	Ser		Glu	Val	Pro	Ser		Lys	Glu	Thr	Lys
	_,	50		_,	_		55		-1		_,	60		_	_	
35		Pro	Gin	Thr	Pro	Asp 70	Asp	Ala	Glu	Glu		Val	Ala	Asp	Asp	
35	-	7 ~~	T 011	71.	Dwo		77.	Dwo	71.	T	75 	D	2	m\	0	80
	ASII	Asp	Leu	AIA	85	GIII	Ala	PIO	AIA	90 90	THE	PIO	Asp	inr	95	Ald
	Thr	Ser	Taye	Δla		Tle	Ara	Agn	I.eu		Aen	Pro	Ser	Gln		Lve
		501	y -S	100			3	-122	105	.1511	p	-10	201	110	, u 1	-y 5
40	Thr	Leu	Gln		Lys	Ala	Gly	Lys		Ala	Glv	Thr	Val		Ala	Val
			115		•		1	120	2		1		125			

	Ile	Asp	Ala	Gly	Phe	Asp	Lys	Asn	His	Glu	Ala	Trp	Arg	Leu	Thr	Asp
		130					135					140				
	Lys	Ala	Lys	Ala	Arg	Tyr	Gln	Ser	Lys	Glu	Asp	Leu	Glu	Lys	Ala	Lys
	145					150					155					160
5	Lys	Glu	His	Gly	Ile	Thr	Tyr	Gly	Glu	$\mathtt{Trp}$	Val	Asn	Asp	Lys	Val	Ala
					165					170					175	
	Tyr	Tyr	His	Asp	Tyr	Ser	Lys	Asp	Gly	Lys	Thr	Ala	Val	Asp	Gln	Glu
				180					185					190		
	His	Gly	Thr	His	Val	Ser	Gly	Ile	Leu	Ser	Gly	Asn	Ala	Pro	Ser	Glu
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	Thr	Lys	Glu	Pro	Tyr	Arg	Leu	Glu	Gly	Ala	Met	Pro	Glu	Ala	Gln	Leu
		210					215					220				
	Leu	Leu	Met	Arg	Val	Glu	Ile	Val	Asn	Gly	Leu	Ala	Asp	Tyr	Ala	Arg
	225					230					235					240
15	Asn	Tyr	Ala	Gln	Ala	Ile	Arg	Asp	Ala	Val	Asn	Leu	Gly	Ala	Lys	Val
					245					250					255	
	Ile	Asn	Met	Ser	Phe	Gly	Asn	Ala	Ala	Leu	Ala	Tyr	Ala	Asn	Leu	Pro
				260					265					270		
	Asp	Glu	Thr	Lys	Lys	Pro	Phe	Val	Tyr	Ala	Lys	Ser		Gly	Val	Arg
20			275					280					285			
	Ile	Val	Thr	Thr	Ala	Gly	Asn	Asp	Ser	Ser	Phe		Gly	Lys	Thr	Arg
		290					295					300				
	Leu	Pro	Leu	Ala	Asp	His	Pro	Asp	Tyr	Gly		Val	Gly	Thr	Pro	
	305					310					315					320
25	Ala	Ala	Asp	Ser		Leu	Thr	Val	Ala		Tyr	Ser	Pro	Asp		Gln
					325					330				_	335	~1
	Leu	Thr	Glu		Ala	Met	Val	Lys		Asp	Asp	Gln	GIn	Asp	Lys	GIu
				340					345		_	_		350		•
	Met	Pro		Leu	Ser	Thr	Asn		Pne	GIU	Pro	Asn		Ala	TYE	Asp
30			355		_		<b>6</b> 3	360	T	<b>a</b> 1			365		2 42	17-1
	Tyr		Tyr	Ala	Asn	Arg		Met	Lys	GIU	Asp	380	Pne	Lys	Asp	vaı
	_	370	_	- 1		T	375	a1	7		7		7.00	Dho	Thr	7 cm
	_	GIA	ьуѕ	11e	Ата	390	116	GIU	Arg	ser	395	TIE	Asp	Phe	1111	400
	385	<b>*</b> 7 -	77-	7	71-		Tura	717	Gly	- ו מ		Gl.v	37 a 3	Leu	Tle	
35	гÀг	iie	Ата	ASII	405		пур	Ala	Gry	410	vai	GIY	vai	пси	415	171
	2 00	7	~1 <b>~</b>	7			Dho	Dro	Tla		ĭ.e.,	Pro	Asn	val		Gln
	Asp	Asn	GIN	420	пув	GIY	rne	FIO	425		Deu	F10	Aon	430	rap	0111
	Mot	Dro	- רת		Dhe	Tla	Ser	Ara			Glv	Len	Len		Lvs	Asp
40	mec	FIO	435		. 116	16	Jel		БуБ		- Y		445		_, 5	

	Asn	Ser	Gln	Lys	Thr	Ile	Thr	Phe	Asn	Ala	Thr	Pro	Lys	Val	Leu	Pro
		450					455					460				
	Thr	Ala	Ser	Gly	Thr	Lys	Leu	Ser	Arg	Phe	Ser	Ser	Trp	Gly	Leu	Thr
	465					470					475					480
5	Ala	Asp	Gly	Asn	Ile	Lys	Pro	Asp	Ile	Ala	Ala	Pro	Gly	Gln	Asp	Ile
					485					490					495	
	Leu	Ser	Ser	Ala	Ala	Asn	Asn	Lys	Tyr	Ala	Lys	Leu	Ser	Gly	Thr	Ser
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	Met	Ser	Ala	Pro	Leu	Val	Ala	Val	Ile	Met	Gly	Leu	Leu	Gln	Lys	Gln
10			515					520					525			
	Tyr	Glu	Thr	Gln	Tyr	Pro	Asp	Met	Thr	Gln	Ser	Glu	Arg	Leu	Asp	Leu
		530					535					540				
		Lys	Lys	Val	Leu		Ser	Ser	Ala	Thr	Ala	Leu	Tyr	Asp	Glu	Asp
	545					55Q					555					560
15	Glu	Lys	Ala	Tyr		Ser	Pro	Arg	Gln		Gly	Ala	Gly	Ala	Val	Asp
					565					570					575	
	Ala	Lys	Lys		ser	Glu	Ala	Thr		Tyr	Val	Thr	Asp	Lys	Asp	Asn
				580					585					590		
	Thr	Ser		Lys	Val	His	Leu		Asn	Val	Ser	Asp		Phe	Glu	Val
20	mb	**- 3	595	**- 3	***			600	_	_	_		605			
	unr	Va1	Thr	Val	His	Asn		Ser	Asp	Lys	Pro		Glu	Leu	Tyr	Tyr
	<i>~</i> 1~		m>	TT0 3	<b>01</b> =	The sec	615	T	77- 7			620				
	625	Ald	1111	Val	GIII	630	Asp	гуѕ	vai	Asp		ьуs	Hls	Phe	Ala	
2 5		Dwa	T	77.	T 0.11		~1	mb	0	<b></b>	635	_		_,		640
23	AIG	FIU	цуъ	AIA	645	116	Giu	1111	Sei	650	GIII	гуѕ	ile	Thr		Pro
	Δla	Agn	Ser	Ser		Gln	Val	Thr	Tle		Tle	Λαn	Tlo	Ser	655	Dha
	niu	ASII	501	660	Lys	OIII	vai	1111	665	FIO	116	Asp	IIE	670	GIN	Pne
	Ser	Lvs	Asp		Leu	Ala	Gln	Met		Δen	Glv	Tyr	Dhe	Leu	Gl u	Cly
30		-1-	675					680	-15	11011	Cly	171	685	пец	Giu	GIY
	Phe	Val		Ile	Lys	Gln	asp		Thr	Lvs	Glu	Glu		Met	Ser	Tle
		690			-		695					700			501	110
	Pro	Tyr	Ile	Gly	Phe	Arg		Asp	Phe	Glv	Asn		Ser	Ala	Leu	Glu
	705			_		710	_	_		•	715					720
35	Lys	Pro	Leu	Tyr	Asp	Ser	Lys	Asp	Gly	Ser	Ser	Tyr	Tyr	His	Glu	
					725				_	730		-	•		735	
	Ile	Ser	Asp	Ala	Lys	Asp	Gln	Leu	Asp	Gly	Asp	Gly	Leu	Gln		Tyr
				740					745	-	-	-		750		•
	Ala	Leu	Lys	Asn	Asp	Phe	Thr	Ala	Leu	Thr	Thr	Glu	Ser	Asn	Pro	Trp
40			755					760					765			

	Thr	Ile	Ile	Asn	Val	Val	Lys	Glu	Gly	Val	Glu	Asn	Ile	Glu	Asp	Ile
		770					775					780				
	Glu	Ser	Ser	Glu	Ile	Thr	Glu	Thr	Ile	Phe	Ala	Gly	Thr	Phe	Ala	Lys
	785					790					795					800
5	Gln	Asp	Asp	Asp	Arg	His	Tyr	Tyr	Ile	His	Arg	His	Ala	Asn	Gly	Lys
					805					810					815	
	Pro	Tyr	Ala	Ala	Ile	Ser	Pro	Asn	Gly	Asp	Gly	Asn	Arg	Asp	Tyr	Val
				820					825					830		
	Gln	Phe	His	Gly	Thr	Phe	Leu	Arg	Asn	Ala	Lys	Asn	Leu	Val	Ala	Glu
10			835					840					845			
	Val	Leu	Asp	Lys	Glu	Gly	Asn	Val	Val	Trp	Thr	Ser	Glu	Val	Thr	Glu
		850					855					860				
	Gln	Val	Val	Lys	Asn	Tyr	Asn	Asn	Asp	Leu	Ala	Ser	Thr	Leu	Gly	Ser
	865					870					875					880
15	Thr	Arg	Phe	Glu	Ile	Ser	Arg	Trp	Asp	Gly	Lys	Asp	Lys	Asp	Ala	Lys
					885					890					895	
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	Arg	Arg	Leu	Thr	Leu	Ala	Ser	Lys	Pro	Gln	Thr	Ser	Gln	Pro	Val	Tyr
	945					950					955					960
25	Arg	Glu	Arg	Ile	Ala	Tyr	Thr	Tyr	Met	Asp	Glu	Asp	Leu	Pro	Thr	Thr
					965					970					975	
	Glu	Tyr	Ile		Pro	Asn	Glu	Asp		Thr	Phe	Thr	Leu	Pro	Glu	Glu
				980					985					990		
	Ala	Glu		Met	Glu	Gly	Ala			Pro	Leu	Lys	Met	Ser	Asp	Phe
30			995					1000					1005			
	Thr			Val	Glu	Asp			Gly	Asn	Ile	Thr	Tyr	Thr	Pro	Val
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			Leu	Leu	Glu			Ser	Asn	Lys	Pro	Glu	Gln	Asp	Gly	Ser
	1025					1030					1035					1040
35	Asp	Gln	Ala	Pro			Lys	Pro	Glu			Pro	Glu	Gln	Asp	Gly
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	Ser	Asp	Gln			Asp	Lys	Lys			Thr	Lys	Pro	Gly		Asp
		_		1060		_			1065					1070		
	Gly	Ser			Thr	Pro				Pro	Glu	Thr		Pro	Glu	Lys
40			1075					1080	•				1085	i		

	Asp	Ser	Ser	Gly	Gln	Thr	Pro	Gly	Lys	Thr	Pro	Gln	Lys	Gly	Gln	Pro
		109	0				109	5				110	0			
	Ser	Arg	Thr	Leu	Glu	Lys	Arg	Ser	Ser	Lys	Arg	Ala	Leu	Ala	Thr	Lys
	110	5				111	0				111	5				1120
5	Ala	Ser	Thr	Arg	Asp	Gln	Leu	Pro	Thr	Thr	Asn	Asp	Lys	Asp	Thr	Asn
					112	5				113	0				113	5
	Arg	Leu	His	Leu	Leu	Lys	Leu	Val	Met	Thr	Thr	Phe	Phe	Leu	Gly	Leu
				114	0				114	5				115	)	
	Val	Ala	His	Ile	Phe	Lys	Thr	Lys	Arg	Thr	Glu	Asp				
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		<	210>	2												
		<	211>	116	7											
		<	212>	PRT												
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		<	400>	2												
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	1				5					10					15	
20	Met	Ser	Thr	Ser	Ile	Leu	Leu	Asn	Ala	Gln	Ser	Asp	Ile	Lys	Ala	Asn
				20					25					30		
	Thr	Val	Thr	Glu	Asp	Thr	Pro	Va1	Thr	Glu	Gln	Ala	Val	Glu	Thr	Pro
			35					40					45			
	Gln	Pro	Thr	Ala	Val	Ser	Glu	Glu	Val	Pro	Ser	Ser	Lys	${\tt Glu}$	Thr	Lys
25		50					55					60				
	Thr	Pro	Gln	Thr	Pro	Asp	Asp	Ala	Glu	G1u	Thr	Ile	Ala	qaA	Asp	Ala
	65					70					75					80
	Asn	Asp	Leu	Ala	Pro	Gln	Ala	Pro	Ala	Lys	Thr	Ala	Asp	Thr	Pro	Ala
					85					90					95	
30	Thr	Ser	Lys	Ala	Thr	Ile	Arg	Asp	Leu	Asn	Asp	Pro	Ser	Gln	Val	Lys
				100					105					110		
	Thr	Leu		Glu	Lys	Ala	Gly	Lys	Gly	Ala	Gly	Thr	Val	Val	Ala	Val
			115					120					125			
	Ile		Ala	Gly	Phe	Asp		Asn	His	Glu	Ala	Trp	Arg	Leu	Thr	Asp
35		130					135					140				
		Thr	Lys	Ala	Arg		Gln	Ser	Lys	Glu		Leu	Glu	Lys	Ala	Lys
	145					150					155					160
	Lys	Glu	His	Gly		Thr	Tyr	Gly	Glu	Trp	Val	Asn	Asp	Lys		Ala
	_	_			165	_	_			170					175	
40	Tyr	Tyr	His	Asp	Tyr	Ser	Lys	Asp	Gly	Lys	Thr	Ala	Val	Asp	Gln	Glu

				180					185					190		
	His	Gly	Thr	His	Val	Ser	Gly	Ile	Leu	Ser	Gly	Asn	Ala	Pro	Ser	Glu
			195					200					205			
	Thr	Lys	Glu	Pro	Tyr	Arg	Leu	Glu	Gly	Ala	Met	Pro	Glu	Ala	Gln	Leu
5		210					215					220				
	Leu	Leu	Met	Arg	Val	Glu	Ile	Val	Asn	Gly	Leu	Ala	Asp	Tyr	Ala	Arg
	225					230					235					240
	Asn	Tyr	Ala	Gln	Ala	Ile	Arg	Asp	Ala	Val	Asn	Leu	Gly	Ala	Lys	Val
					245					250					255	
10	Ile	Asn	Met	Ser	Phe	Gly	Asn	Ala	Ala	Leu	Ala	Tyr	Ala	Asn	Leu	Pro
				260					265			_		270		
	Asp	Glu	Thr	Lys	Lys	Ala	Phe	Asp	Tyr	Ala	Lys	Ser	Lys	Gly	Val	Ser
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	Ile	Val	Thr	Ser	Ala	Gly	Asn	Asp	Ser	Ser	Phe	Gly	Gly	Lys	Thr	Arg
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	Leu	Pro	Leu	Ala	Asp	His	Pro	Asp	Tyr	Gly	Val	Val	Gly	Thr	Pro	Ala
	305					310			_	_	315		_			320
	Ala	Ala	Asp	Ser	Thr	Leu	Thr	Val	Ala	Ser	Tyr	Ser	Pro	Asp	Lys	Gln
					325					330	-			-	335	
20	Leu	Thr	Glu	Thr	Ala	Met	Val	Lys	Thr	Asp	Asp	Gln	Gln	Asp	Lys	Glu
				340					345					350	-	
	Met	Pro	Val	Leu	Ser	Thr	Asn	Arg	Phe	Glu	Pro	Asn	Lys	Ala	Tyr	qaA
			355					360					365		-	-
	Tyr	Ala	Tyr	Ala	Asn	Arg	gly	Met	Lys	Glu	Asp	Asp	Phe	Lys	Asp	Val
25		370					375					380				
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	385					390					395					400
	Lys	Val	Ala	Asn	Ala	Lys	Lys	Ala	Gly	Ala	Val	Gly	Val	Leu	Ile	Tyr
					405					410					415	
30	Asp	Asn	Gln	Asp	Lys	Gly	Phe	Pro	Ile	Glu	Leu	Pro	Asn	Val	Asp	Gln
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	Met	Pro	Ala	Ala	Phe	Ile	Ser	Arg	Lys	Asp	Gly	Leu	Leu	Leu	Lys	Asp
			435					440			-		445		-	-
	Asn	Pro	Gln	Lys	Thr	Ile	Thr	Phe	Asn	Ala	Thr	Pro	Lys	Val	Leu	Pro
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	Thr	Ala	Ser	Gly	Thr	Lys	Leu	Ser	Arg	Phe	Ser	Ser	Trp	Gly	Leu	Thr
	465			-		470			_		475		-	•		480
	Ala	Asp	Gly	Asn	Ile	Lys	Pro	Asp	Ile	Ala	Ala	Pro	Gly	Gln	Asp	
		-	-		485	-		-		490			•		495	
40	Leu	Ser	Ser	Val	Ala	Asn	Asn	Lys	Tyr	Ala	Lys	Leu	Ser	Gly	Thr	Ser

				500					505					510		
	Met	ser	Ala	Pro	Leu	Val	Ala	Gly	Ile	Met	Gly	Leu	Leu	Gln	Lys	Gln
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	Tyr	Glu	Thr	Gln	Tyr	Pro	Asp	Met	Thr	Pro	Ser	Glu	Arg	Leu	Asp	Leu
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	Ala	Lys	Lys	Val	Leu	Met	Ser	ser	Ala	Thr	Ala	Leu	Tyr	Asp	Glu	Asp
	545					550					555					560
	Glu	Lys	Ala	Tyr	Phe	Ser	Pro	Arg	Gln	Gln	Gly	Ala	Gly	Ala	Val	Asp
					565					570					575	
10	Ala	Lys	Lys	Ala	ser	Ala	Ala	Thr	Met	Tyr	Val	Thr	Asp	Lys	Asp	Asn
				580					585					590		
	Thr	Ser	Ser	Lys	Val	His	Leu	Asn	Asn	Val	Ser	Asp	Lys	Phe	Glu	Val
			595					600					605			
	Thr	Val	Thr	Val	His	Asn	Lys	ser	Asp	Lys	Pro	Gln	Glu	Leu	Tyr	Tyr
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	Gln	Ala	Thr	Val	Gln	Thr	Asp	Lys	Val	Asp	Gly	Lys	His	Phe	Ala	Leu
	625					630					635					640
	Ala	Pro	Lys	Val	Leu	Tyr	Glu	Ala	Ser	Trp	Gln	Lys	Ile	Thr	Ile	Pro
					645					650					655	
20	Ala	Asn	Ser	Ser	Lys	Gln	Val	Thr	Val	Pro	Ile	Asp	Ala	Ser	Arg	Phe
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	Ser	Lys	Asp	Leu	Leu	Ala	Gln	Met	Lys	Asn	Gly	Tyr	Phe	Leu	Glu	Gly
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	Phe	Val	Arg	Phe	Lys	Gln		Pro	Thr	Lys	Glu	Glu	Leu	Met	Ser	Ile
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	Pro	Tyr	Ile	Gly	Phe	_	Gly	Asp	Phe	Gly		Leu	Ser	Ala	Val	
	705					710					715					720
	Lys	Pro	Ile	Tyr		Ser	Lys	Asp	Gly		Ser	Tyr	Tyr	His		Ala
					725					730					735	
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				740		- •			745			_		750		
	Ala	Leu	_	Asn	Asn	Phe	Thr		Leu	Thr	Thr	Glu		Asn	Pro	Trp
		_	755		_			760					765			
	Thr		Ile	Lys	Ala	Val	-	Glu	GIY	Val	Glu		Ile	Glu	Asp	Ile
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		Ser	Ser	Glu	Ile		Glu	Thr	шe	Phe		GIY	Thr	Phe	Ala	-
	785					790	m	m.	T.7	***	795				~ 7	800
	Gln	Asp	Asp	Asp		His	Tyr	Tyr	ITE		Arg	His	Ala	Asn	_	GIu
					805	Or :	D	7	<i>a</i> -	810	a.				815	
40	Pro	Tyr	Ala	Ala	тте	ser	PTO	ASN	ΥΥ	Asp	GIV	Asn	Arq	Asp	Tyr	val

				820					825					830		
	Gln	Phe	Gln	Gly	Thr	Phe	Leu	Arg	Asn	Ala	Lys	Asn	Leu	Val	Ala	Glu
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	Val	Leu	Asp	Lys	Glu	Gly	Asn	Val	Val	Trp	Thr	ser	Glu	Val	Thr	Glu
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	Gln	Val	Val	Lys	Asn	Tyr	Asn	Asn	Asp	Leu	Ala	Ser	Thr	Leu	Gly	Sei
	865					870					875					880
	Thr	Arg	Phe	Glu	Lys	Thr	Arg	Trp	Asp	Gly	Lys	Asp	Lys	Asp	Gly	Lys
					885					890					895	
10	Val	Val	Ala	Asn	Gly	Thr	Tyr	Thr	Tyr	Arg	Val	Arg	Tyr	Thr	Pro	Ile
				900					905					910		
	Ser	Ser	Gly	Ala	Lys	Glu	Gln	His	Thr	Asp	Phe	Asp	Val	Ile	Val	Ası
			915					920					925			
	Asn	Thr	Thr	Pro	Glu	Val	Ala	Thr	Ser	Ala	Thr	Phe	Ser	Thr	Glu	Asp
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	Arg	Arg	Leu	Thr	Leu	Ala	Ser	Lys	Pro	Lys	Thr	Ser	Gln	Pro	Val	ту
	945					950					955					960
	Arg	Glu	Arg	Ile	Ala	Tyr	Thr	Tyr	Met	Asp	Glu	Asp	Leu	Pro	Thr	Th:
					965					970					975	
20	Glu	Tyr	Ile	Ser	Pro	Asn	Glu	Asp	Gly	Thr	Phe	Thr	Leu	Pro	Glu	Gli
				980					985					990		
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	Ala	Asp	Gly	Asn	Ile	Lys	Pro	Asp	Ile	Ala	Ala	Pro	Gly	Gln	Asp	Ile
15					485					490					495	
	Leu	Ser	Ser	Val	Ala	Asn	Asn	Lys	Tyr	Ala	Lys	Leu	Ser	Gly	Thr	Ser
				500					505					510		
	Met	Ser	Ala	Pro	Leu	Val	Ala	gly	Ile	Met	gly	Leu	Leu	${\tt Gln}$	Lys	Gln
			515					520					525			
20	Tyr	Glu	Thr	Gln	Tyr	Pro	Asp	Met	Thr	Pro	Ser	Glu	Arg	Leu	Asp	Leu
		530					535					540				
	Ala	Lys	Lys	Val	Leu	Met	ser	Ser	Ala	Thr	Ala	Leu	Tyr	Asp	Glu	Asp
	545					550					555					560
	Glu	Lys	Ala	Tyr	Phe	ser	Pro	Arg	Gln	Gln	Gly	Ala	Gly	Ala	Val	Asp
25					565					570					575	
	Ala	Lys	Lys	Ala	Ser	Ala	Ala	Thr	Met	Tyr	Val	Thr	Asp	Lys	Asp	Asn
				580					585					590		
	Thr	Ser	Ser	Lys	Val	His	Leu	Asn	Asn	Val	Ser	Asp	Lys	Phe	Glu	Val
			595					600					605			
3 0	Thr	Val	Thr	Val	His	Asn	Lys	Ser	Asp	Lys	Pro	Gln	Glu	Leu	Tyr	Tyr
		610					615					620				
	Gln	Ala	Thr	Val	Gln	Thr	Asp	Lys	Val	Asp	Gly	Lys	Leu	Phe	Ala	Leu
	625					630					635					640
	Ala	Pro	Lys	Ala	Leu	Tyr	Glu	Ala	Ser	Trp	Gln	Lys	Ile	Thr	Ile	Pro
3 5					645					650					655	
	Ala	Asn	Ser	Ser	Lys	Gln	Val	Thr	Ile	Pro	Ile	Asp	Val	Ser	Gln	Phe
				660					665					670		
	Ser	Lys	Asp	Leu	Leu	Ala	Pro	Met	Lys	Asn	Gly	Tyr	Phe	Leu	Glu	Gly
			675					680					685			
10	Phe	Val	Ara	Phe	Lvs	Gln	Asp	Pro	Thr	Lvs	Glu	Glu	T.eu	Met	Ser	Tle

		690					695					700				
	Pro	Tyr	Ile	Gly	Phe	Arg	Gly	Asp	Phe	Gly	Asn	Leu	Ser	Ala	Leu	Glu
	705					710					715					720
	Lys	Pro	Ile	Tyr	Asp	Ser	Lys	Asp	Gly	Ser	Ser	Tyr	Tyr	His	Glu	Ala
5					725					730					735	
	Asn	Ser	Asp	Ala	Lys	Asp	Gln	Leu	Asp	Gly	Asp	Gly	Leu	Gln	Phe	Tyr
				740					745					750		
	Ala	Leu	Lys	Asn	Asn	Phe	Thr	Ala	Leu	Thr	Thr	Glu	Ser	Asn	Pro	Trp
			755					760					765			
10	Thr	Ile	Ile	Lys	Ala	Val	Lys	Glu	Gly	Val	Glu	Asn	Ile	Glu	Asp	Ile
		770					775					780				
	Glu	Ser	Ser	Glu	Ile	Thr	Glu	Thr	Ile	Phe	Ala	Gly	Thr	Phe	Ala	Lys
	785					790					795					800
	Gln	Asp	Asp	Asp	Ser	His	Tyr	Tyr	Ile	His	Arg	His	Ala	Asn	Gly	Lys
15					805					810					815	
	Pro	Tyr	Ala	Ala	Ile	Ser	Pro	Asn	Gly	Asp	Gly	Asn	Arg	Asp	Tyr	Val
				820					825					830		
	Gln	Phe	Gln	Gly	Thr	Phe	Leu	Arg	Asn	Ala	Lys	Asn	Leu	Val	Ala	Glu
			835					840					845			
20	Val	Leu	Asp	Lys	Glu	Gly	Asn	Val	Val	Trp	Thr	Ser	Glu	Val	Thr	Glu
		850					855					860				
	Gln	Val	Val	Lys	Asn	Tyr	Asn	Asn	Asp	Leu	Ala	Ser	Thr	Leu	Gly	Ser
	865					870					875					880
	Thr	Arg	Phe	Glu	Lys	Thr	Arg	${\tt Trp}$	Asp	Gly	Lys	Asp	Lys	Asp	Gly	Lys
25					885					890					895	
	Val	Val	Ala	Asn	Gly	Thr	Tyr	Thr	Tyr	Arg	Val	Arg	Tyr	Thr	Pro	Ile
				900					905					910		
	Ser	Ser	Gly	Ala	Lys	Glu	Gln	His	Thr	Asp	Phe	Asp	Val	Ile	Val	Asp
			915					920					925			
30	Asn	Thr	Thr	Pro	Glu	Val	Ala	Thr	Ser	Ala	Thr	Phe	Ser	Thr	Glu	Asp
		930					935					940				
	Arg	Arg	Leu	Thr	Leu	Ala	Ser	Lys	Pro	Lys	Thr	Ser	Gln	Pro	Val	Tyr
	945					950					955					960
	Arg	Glu	Arg	Ile	Ala	Tyr	Thr	Tyr	Met	Asp	Glu	Asp	Leu	Pro	Thr	Thr
35					965					970					975	
	Glu	Tyr	Ile	Ser	Pro	Asn	Glu	Asp	Gly	Thr	Phe	Thr	Leu	Pro	Glu	Glu
				980					985					990		
	Ala	Glu	Thr	Met	Glu	Gly	Ala	Thr	Val	Pro	Leu	Lys	Met	Ser	Asp	Phe
			995					1000	)				1005	5		
10	Thr	Tvr	Val	Val	Glu	Asp	Met	Ala	Glv	Asn	Tle	Thr	Tyr	Thr	Pro	V=1

		1010	)				1015						1020				
	Thr	Lys	Leu	Leu	Glu	Gly	His	Ser	Asn	Lys	Pro	Glu	Gln	Asp	Gly	Ser	
	1025 1030						)				1039	5			1040		
	Asp	Gln	Ala	Pro	Asp	Lys	Lys	Pro	Glu	Thr	Lys	Pro	Glu	Gln	Asp	Gly	
5					1045	5				105	)				1059	5	
	Ser	Gly	Gln	Ala	Pro	Asp	Lys	Lys	Pro	Glu	Thr	Lys	Pro	Glu	Gln	Asp	
				1060	)				1069	5				1070			
	Gly	Ser	Gly	Gln	Thr	Pro	Asp	Lys	Lys	Pro	Glu	Thr	Lys	Pro	Glu	Gln	
			1075	5				1080	)				1085	5			
10	Asp	Gly	Ser	Gly	Gln	Thr	Pro	Asp	Lys	Lys	Pro	Glu	Thr	Lys	Pro	Glu	
		1090	)				1095	5				1100					
	Lys	Asp	Ser	Ser	Gly	Gln	Thr	Pro	Gly	Lys	Thr	Pro	Gln	Lys	Gly	Gln	
	1105	5				1110	111					115				1120	
	Pro	Ser	Arg	Thr	Leu	Glu	Lys	Arg	Ser	Ser	Lys	Arg	Ala	Leu	Ala	Thr	
15					1125	5				1130	)				1135	5	
	Lys	Ala	Ser	Thr	Arg	Asp	Gln	Leu	Pro	Thr	Thr	Asn	Asp	Lys	Asp	Thr	
				1140	)				1145	5				1150	)		
	Asn	Arg	Leu	His	Leu	Leu	Lys	Leu	Val	Met	Thr	Thr	Phe	Phe	Leu	Gly	
			1155	5				1160	)				1165	5			
20	Leu	Val	Ala	His	Ile	Phe	Lys	Thr	Lys	Arg	Thr	Lys	Lys				
	1170						1175	5				1180	)				